

WHAT IS CLAIMED IS:

1. A surgical operation apparatus comprising:
  - a surgical instrument;
  - a drive device that generates an energy with which the surgical
  - 5 instrument works;
  - an energy transmission cable that has a first end and a second end, and that transmits the energy, the first end being connected to the drive device;
  - a first connector provided on the second end;
  - 10 an energy release unit that releases the energy transmitted by the electric transmission cable out of the first connector;
  - a second connector that is detachable from the first connector;
  - an energy receiving unit that receives the energy released from the energy release unit, and
  - 15 an operation functioning unit that functions based on the energy received in the energy receiving unit.
2. The surgical operation apparatus according to claim 1, wherein
  - the energy release unit is disposed inside the first connector,
  - 20 the second connector is provided in the surgical instrument,
  - the energy receiving unit is disposed inside the second connector, and
  - the operation functioning unit is provided in the surgical instrument.

3. The surgical operation apparatus according to claim 1, wherein the surgical instrument includes a probe that transmits the energy from the energy release unit to a biomedical tissue of a body to be operated.
- 5 4. The surgical operation apparatus according to claim 1, further comprising a latch that fixes the first connector on the second connector.
5. The surgical operation apparatus according to claim 1, further  
10 comprising:  
a first magnetism generation unit that is provided in the first connector and that generates a first magnetism; and  
a second magnetism generation unit that is provided in the second connector and that generates a second magnetism that attracts  
15 the first magnetism.
6. The surgical operation apparatus according to claim 1, further comprising:  
an identification information storage unit that is disposed inside  
20 the second connector and that stores at least identification information of the surgical instrument;  
a first information exchange unit that is disposed inside the first connector and that transmits a signal out of the first connector, the signal being used for storing information in the identification information  
25 storage unit and for reading the information from the identification

information storage unit; and

a second information exchange unit that is disposed inside the second connector, that receives the signal to store the information in the identification information storage unit, and that reads the  
5 information from the identification information storage unit.

7. The surgical operation apparatus according to claim 6, wherein the drive device includes a control unit that controls generation of the energy with a drive parameter conformed to characteristics of the  
10 surgical instrument based on the identification information read by the first information exchange unit.

8. The surgical operation apparatus according to claim 1, wherein the surgical instrument includes  
15 an ultrasonic vibrator that generates an ultrasonic vibration according to the energy received by the energy receiving unit; and  
an ultrasonic vibration treatment unit that is vibrated by the ultrasonic vibration.

20 9. The surgical operation apparatus according to claim 1, wherein the surgical instrument includes  
a treatment current generation unit that generates a high-frequency current for treatment according to the energy received by the energy receiving unit; and  
25 a treatment electrode through which the current flows, the

treatment electrode performing a high-frequency treatment on a body to be operated based on the current.

10. The surgical operation apparatus according to claim 1, wherein  
5 the drive device generates a first energy that is an electric energy as the energy,

the energy release unit is disposed inside the first connector, converts the first energy transmitted by the electric transmission cable into a second energy, and releases the second energy out of the first  
10 connector,

the energy receiving unit is disposed inside the second connector, receives the second energy, and converts the second energy into an electric energy, and

the operation functioning unit is provided on the surgical  
15 instrument and functions based on the electric energy converted by the energy receiving unit.

11. The surgical operation apparatus according to claim 1, wherein  
the surgical instrument is one of a laser scalpel, a microwave scalpel, a  
20 thermal scalpel, and an electric drill.

12. The surgical operation apparatus according to claim 1, further comprising:

a remote operation unit that performs a remote operation; and  
25 a surgical operation manipulator that includes an arm that

moves the surgical instrument to operate a body with the surgical instrument according to a command from the remote operation unit, wherein

the energy transmission cable is disposed on the surgical operation manipulator, and the first connector is disposed inside the arm.

13. The surgical operation apparatus according to claim 12, wherein the surgical instrument includes a probe that transmits the energy from the energy release unit to a biomedical tissue of a body to be operated.

14. The surgical operation apparatus according to claim 12, further comprising:

a first magnetism generation unit that is provided in the first connector and that generates a first magnetism;

a second magnetism generation unit that is provided in the second connector and that generates a second magnetism that attracts the first magnetism; and

a magnetism generation control unit that controls the first magnetism generated in the first magnetism generation unit and the second magnetism generated in the second magnetism generation unit.

15. The surgical operation apparatus according to claim 12, further comprising:

an identification information storage unit that is disposed inside

the second connector and that stores at least identification information of the surgical instrument;

a first information exchange unit that is disposed inside the first connector and that transmits a signal out of the first connector, the  
5 signal being used for storing information in the identification information storage unit and for reading the information from the identification information storage unit; and

a second information exchange unit that is disposed inside the second connector, that receives the signal to store the information in  
10 the identification information storage unit, and that reads the information from the identification information storage unit.

16. The surgical operation apparatus according to claim 15, wherein the drive device includes a control unit that controls generation of the  
15 energy with a drive parameter conformed to characteristics of the surgical instrument based on the identification information read by the first information exchange unit.

17. The surgical operation apparatus according to claim 12, wherein  
20 the surgical instrument includes

an ultrasonic vibrator that generates an ultrasonic vibration according to the energy received by the energy receiving unit; and

an ultrasonic vibration treatment unit that is vibrated by the ultrasonic vibration.

18. The surgical operation apparatus according to claim 12, wherein the surgical instrument includes

a treatment current generation unit that generates a high-frequency current for treatment according to the energy received  
5 by the energy receiving unit; and

a treatment electrode through which the current flows, the treatment electrode performing a high-frequency treatment on a body to be operated based on the current.

10 19. The surgical operation apparatus according to claim 12, wherein the drive device generates a first energy that is an electric energy as the energy,

the energy release unit is disposed inside the first connector, converts the first energy transmitted by the electric transmission cable  
15 into a second energy, and releases the second energy out of the first connector,

the energy receiving unit is disposed inside the second connector, receives the second energy, and converts the second energy into an electric energy, and

20 the operation functioning unit is provided on the surgical instrument and functions based on the electric energy converted by the energy receiving unit.

20. The surgical operation apparatus according to claim 12, wherein the surgical instrument is one of a laser scalpel, a microwave scalpel, a thermal scalpel, and an electric drill.

5 21. A method of controlling a surgical operation apparatus that includes a first connector that releases energy generated by a drive device, a second connector that receives the energy, and a surgical instrument provided on the second connector, the method comprising:

reading information of the surgical instrument from an  
10 identification information storage unit provided in the second connector by using a first information exchange unit provided in the first connector; and

setting a drive state of the drive device based on the information.

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22. The method according to claim 21, further comprising detecting interconnection between the first connector and the second connector.

23. The method according to claim 21, further comprising:

20 stopping reading of information by the first information exchange unit after the drive state of the drive device is set; and

generating the energy in the drive device based on the drive state after reading of information by the first information exchange unit is stopped.

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24. The method according to claim 23, further comprising:  
detecting drive information of the drive device;  
transmitting the drive information through the first information  
exchange unit;  
5 receiving the drive information transmitted, by a second  
information exchange unit provided in the second connector; and  
storing the drive information received in the identification  
information storage unit.
- 10 25. The method according to claim 21, wherein the surgical  
instrument is selected from a plurality of surgical instruments.
26. The method according to claim 21, wherein the surgical  
instrument is one of a laser scalpel, a microwave scalpel, a thermal  
15 scalpel, and an electric drill.